ABSTRACT

The plant was preferred for study belongs to family Oxalidaceae by Taxonomical Nomenclature. The present proposed study has been aimed to microscopically validate the plant *Biophytum intermedium* stem Wight. But no reports are available on pharmacognostical studies, hence current effort was undertaken to investigate the microscopical studies on the stem of *Biophytum intermedium* Wight. Pharmacognostical studies mainly include study of morphological characters, microscopical characters and powder microscopy. The aim and objective of this study is to determine the similarities and differences in the plants, including their nearer relationship with their descents from general origin. It is a scientific way of identifying the plants in an ordered manner.

Keywords: *Biophytum intermedium*, Pharmacognostical studies, Stem, Powder microscopy.

INTRODUCTION

*Biophytum intermedium* Wight is generally known as Parainellipachalai[1]. They are herbs, perennial, semiwoody at base, erect, 60-120cm height; nodes hairy; hairs stiff, refluxed, arranged in a ring [2]. *Biophytum* genus, a large genus of herbs, distributed in tropical Asia, Africa and America. About nine species occur in India. Ethno medically *Biophytum* genus plants claimed to possess leaves are used as diuretic, astringent, antiseptic and in dressing burns, contusions, wounds, cuts, asthma, and phthisis. An aqueous extract of the fresh leaves
partially inhibited the growth of *Mycobacterium tuberculosis*. The whole plant is dried, powdered and given internally to cattle, to stop excess salivation. Also used in chest complaints, insomnia, convulsions, cramps and inflammatory tumors and its ash in stomach ache. The mature leaves contain insulin-like principle and are recommended in diabetes. A saline extract of the leaves showed hypoglycemic activity in rabbits. Plant juice is given to cure diarrhoea. Roots are also used for the recovery in jaundice. Plant ash mixed with lemon juice is given in stomachache. *Biophytum intermedium* plant paste is consumed with water for the treatment of stomach disorders. In spite of the numerous medicinal uses attributed to this plant genus, pharmacognosy evaluation about this plant has not been validated. Hence, the present investigation is an attempt in this direction and includes morphological and microscopical evaluation, powder microscopy of stem of *B. intermedium* Wight.

**MATERIALS AND METHODS**

**Plant Material Collection**

The stem of *B. intermedium* was collected from Kutralam, Tamilnadu, India during the month of November 2012. The botanical identity of the plant was confirmed by Dr. P. Jeyaraman, Director, Plant Anatomy Research Centre (PARC), Chennai, Tamilnadu, India. After authentication by a botanist, a voucher specimen number, PARC/2013/2012, has been deposited in the museum of the Plant Anatomy Research Centre (PARC), Chennai, Tamilnadu, India.

**PHARMACOGNOSTICAL STUDIES**

**Method**

Morphological studies such as colour, odour, taste, size, shape, surface, and fracture of the stem were carried out. The microscopical studies were carried out with thin transverse section of the stem. The required samples were cut and fixed in FAA (Formalin-5ml + Acetic acid-5ml + 70% Ethyl alcohol-90ml). After 24hrs of fixing, the specimens were dehydrated with graded series of tertiary butyl alcohol. Infiltrations of the specimens were carried by gradual addition of paraffin wax (melting point 58-60°C) until TBA solution attained saturation. The specimens were cast into paraffin blocks.

**Sectioning**

The paraffin embedded specimens were sectioned with the help of Rotary Microtome. The thickness of the section was 10-12µm. Dewaxing of the sections were done. The sections were stained with Toluidine blue the dye rendered pink colour to the cellulose walls, blue to
the lignified cells, dark green, to suberin, violet to the mucilage, blue to the protein bodies etc. Wherever necessary sections were also stained with Safranin and Fast-green and Potassium iodide (for Starch). Powdered materials of different parts were cleared with NaOH and mounted in glycerin medium after staining. Different cell component were studied and measured[6,7].

**Photomicrographs**

Photographs of different magnifications were taken with Nikon Labphot 2 microscopic unit. For normal observations bright field was used. For the study of crystals, starch grains and lignified cells, polarized light was employed. Since these structures have birefringent property, under polarized light they appear bright against dark background. Magnifications of the figures are indicated by the scale bars[8,9].

**RESULTS AND DISCUSSION**

**Microscopical features**

The stem is circular in cross sectional view measuring 1.6mm thick. The epidermis of the stem is intact at certain regions and broken in other regions. The periderm is narrow comprising 3 or 4 layers of phellem cells. The cortical region is very narrow and includes wide parenchyma cells. Vascular cylinder is circular, wide with wide central pith (Fig. 1). The vascular cylinder consists of outer fairly distinct cylinder of phloem elements and a thin continuous layer of sclerenchyma elements situated on the outer boundary of the secondary phloem (Fig. 2 and 3).

![Fig. 1: T.S. of stem – entire view](image)

Co-Cortex; VC-Vascular Cylinder; Pi-Pith
Fig. 2 and 3: T.S. of stem – A sector enlarged
OC-Outer Cortex; SPh-Secondary Phloem; AC-Air Chamber; PF-Phloem Fibre; Ep-Epidermis; SX-Secondary Xylem; Co-Cortex

Fig. 4: Secondary Xylem of stem
XF-Xylem Fibre; Ve-Vessel

Fig. 5: Pith cells and starch grains of the stem
PP-Pith Parenchyma; SG-Starch Grains
Secondary xylem includes vessel elements, fibres and xylem rays. The vessel elements are in long radial rows. They are either solitary or in long radial multiples. The elements are elliptical or circular with thick walls. The vessels are 10 to 25µm in diameter. The xylem fibres are in radial compact rows, the cells are highly thick walled with fairly wide lumen (Fig. 4). The pith cells are wide angular and compact. They possess dense accumulation of starch grains (Fig. 5). Calcium oxalate crystals of prismatic type are sparsely distributed in the cortical parenchyma (Fig. 6).

CONCLUSION
Microscopic investigation was carried out on the plant in order to establish suitable data that can be used in identifying crude drugs mainly those supplied in powder form. These are the standard pharmacognostic parameters that can be used to distinguish directly related plant genus or varieties with similar constituents or pharmacological activities. These characters have not been reported in ayurvedic pharmacopeia. So these diagnostic characters of *Biophytum intermedium* Wight are recommended to make necessary inclusions in the ayurvedic pharmacopeia.

REFERENCES


